OBJECTIVES

Participants should be able to do the following.

Roller Coasters

1. Identify points on a typical roller coaster track where cars possess maximum potential energy, maximum kinetic energy, minimum potential energy, and minimum kinetic energy.

2. Plot kinetic energy, potential energy, and total mechanical energy versus height.

3. Calculate the work done by friction as the roller coaster travels from one elevation to another. Calculate the work due to friction for one round trip of the roller coaster ride.

4. Calculate the minimum power and horsepower required to lift a roller coaster to its highest point.

5. Calculate the force of the seat on a passenger for various clock positions in a vertical circle.

6. Use the work-energy theorem and the conservation of energy to calculate the speed of an object after falling through a given vertical height.

7. Use a homemade accelerometer to: (a) calculate the acceleration of a roller coaster down an incline, (b) determine various heights in the park using triangulation.

8. Relate Newton's Law's of motion to the motion of passengers for various rides.

Bumpers Cars

1. Analyze collisions between cars to determine whether momentum and kinetic energy are conserved in the interaction of two or more bodies.

2. List similarities between bumper cars and gas molecules confined in a container.

3. List examples of the second law of thermodynamics.

4. Recognize the role of the rubber bumpers during a collision.

5. Draw a simple electrical circuit diagram to explain the electrical power source for each car.

OBJECTIVES-Continued

Circular Motion Rides

1. Produce a force diagram for a typical rider in the Cajun Cliffhanger.

2. Using two different methods, calculate the centripetal acceleration of a passenger in a horizontal motion ride.

3. Explain the role of friction using appropriate force diagrams for a typical rider on a uniform circular motion ride.

4. Produce velocity and force diagrams for riders at various clock positions.

5. Describe position, velocity, and acceleration for a person riding on the Carousel.

6. Relate speed, radius of curvature, and angle of bank for the Whizzer.

Miscellaneous

1. Determine wave forms and resonant frequencies of a suspension bridge.

2. Keep a journal: (a) describing procedures for collecting appropriate data, (b) calculating answers to questions showing appropriate equations and units